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Ephemeris for Physical Observations

Greenwich Noon.		P.	L−O.	B.	A−L.	*B*.	Q.	E.
1896. May	20	332°·98	95°·542	−24°·88	−42°·90	−20°·52	245°·62	39°·66
	22	332·25	97·188	24·77	43·24	20·84	245·64	39·90
	24	331·54	98·827	24·64	43·57	21·15	245·67	40·13
	26	330·86	100·460	24·49	43·88	21·45	245·71	40·36
	28	330·19	102·086	24·32	44·18	21·74	245·77	40·58
	30	329·54	103·704	−24·14	−44·47	−22·03	245·84	40·80
June	1	328·92	105·313	23·94	44·74	22·30	245·93	41·01
	3	328·32	106·914	23·72	45·00	22·56	246·03	41·22
	5	327·74	108·507	23·49	45·25	22·81	246·15	41·43
	7	327·19	110·090	23·24	45·48	23·04	246·28	41·64
	9	326·66	111·662	−22·97	−45·69	−23·27	246·43	41·84
	11	326·15	113·223	22·69	45·89	23·49	246·59	42·04
	13	325·67	114·773	22·40	46·07	23·69	246·76	42·23
	15	325·21	116·311	22·09	46·24	23·88	246·94	42·42
	17	324·78	117·838	21·77	46·39	24·06	247·14	42·60
	19	324·37	119·353	−21·44	−46·52	−24·22	247·35	42·78
	21	323·99	120·856	21·09	46·64	24·37	247·58	42·95
	23	323·63	122·346	20·73	46·75	24·51	247·82	43·12
	25	323·30	123·823	20·36	46·84	24·64	248·06	43·28
	27	323·00	124·288	19·98	49·92	24·76	248·32	43·44
	29	322·72	126·740	−19·58	−46·98	−24·86	248·59	43·60
July	1	322·47	128·179	19·17	47·03	24·95	248·88	43·75
	3	322·24	129·605	18·76	47·06	25·03	249·17	43·90
	5	322·03	131·018	18·34	47·08	25·09	249·48	44·04
	7	321·85	132·417	17·91	47·08	25·14	249·79	44·18
	9	321·70	133·803	−17·47	−47·08	−25·18	250·12	44·31
	11	321·57	135·175	17·03	47·06	25·20	250·46	44·43
	13	321·46	136·533	16·58	47·03	25·21	250·81	44·55
	15	321·38	137·877	16·12	46·98	25·21	251·16	44·66
	17	321·32	139·207	15·65	46·92	25·20	251·53	44·77
	19	321·29	140·523	−15·18	−46·86	−25·17	251·90	44·87
	21	321·28	141·825	14·71	46·78	25·13	252·28	44·96
	23	321·29	143·114	14·23	46·69	25·07	252·67	45·05

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of Mars, 1896–97. By A. Marth.

Greenwich Noon.		Brightness.	Appar. Diam.	Defect of Illumination q	Equat.	Polar.	Central Meridian. ω_0	Passage of Zero Meridian.			
1896.		m	″	″	″	″	°	h	m	h	m
May	20	0·97	6·15	0·71	0·71	0·00	207·52	10	27	11	8
	22	0·95	6·20	·72	·72	·00	187·68	11	49	12	29
	24	0·94	6·24	·73	·73	·00	167·84	13	10	13	51
	26	0·93	6·28	·75	·74	·00	148·01	14	32	15	13
	28	0·92	6·32	·76	·75	·01	128·19	15	54	16	35
	30	0·90	6·37	0·77	0·76	0·01	108·38	17	15	17	56
June	1	0·89	6·41	·79	·77	·01	88·58	18	36	19	17
	3	0·88	6·45	·80	·78	·01	68·78	19	58	20	38
	5	0·87	6·50	·81	·79	·02	48·99	21	19	22	0
	7	0·86	6·55	·83	·80	·02	29·21	22	40	23	21
	9	0·84	6·59	0·84	0·81	0·02	9·45	...		0	2
	11	0·83	6·64	·85	·82	·02	349·69	0	42	1	23
	13	0·82	6·69	·87	·83	·03	329·94	2	4	2	44
	15	0·80	6·73	·88	·84	·03	310·21	3	25	4	5
	17	0·79	6·78	·89	·85	·04	290·49	4	46	5	26
	19	0·78	6·83	0·91	0·86	0·04	270·78	6	7	6	47
	21	0·77	6·88	·92	·86	·04	251·08	7	28	8	8
	23	0·75	6·93	·94	·87	·05	231·39	8	49	9	29
	25	0·74	6·99	·95	·88	·05	211·72	10	10	10	50
	27	0·73	7·04	·96	·89	·06	192·06	11	31	12	11
	29	0·71	7·09	0·98	0·89	0·06	172·42	12	51	13	32
July	1	0·70	7·15	1·00	·90	·07	152·79	14	12	14	52
	3	0·69	7·20	1·01	·91	·07	133·16	15	33	16	13
	5	0·67	7·26	1·02	·91	·08	113·55	16	53	17	34
	7	0·66	7·32	1·03	·92	·09	93·96	18	14	18	54
	9	0·64	7·37	1·05	0·93	0·09	74·38	19	34	20	15
	11	0·63	7·43	1·06	·93	·10	54·81	20	55	21	35
	13	0·62	7·49	1·08	·94	·10	35·26	22	15	22	55
	15	0·60	7·56	1·09	·94	·11	15·72	23	35	...	
	17	0·59	7·62	1·10	·95	·11	356·20	0	15	0	55
	19	0·57	7·68	1·12	0·96	0·12	336·69	1	36	2	16
	21	0·55	7·75	1·13	·96	·13	317·19	2	56	3	36
	23	0·54	7·82	1·15	·97	·13	297·71	4	16	4	56

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Greenwich Noon.	P.	L − O.	B.	A − L.	*B.*	Q.	E.
1896.	°	°	°	°	°	°	°
July 25	321·32	144·389	13·75	46·59	25·00	253·07	45·13
27	321·37	145·651	13·27	46·48	24·93	253·47	45·21
29	321·44	146·899	−12·78	−46·36	−24·84	253·88	45·28
31	321·54	148·133	12·29	46·23	24·74	254·30	45·34
Aug. 2	321·66	149·354	11·80	46·09	24·62	254·72	45·39
4	321·79	150·561	11·30	45·95	24·49	255·15	45·43
6	321·94	151·754	10·81	45·80	24·36	255·58	45·47
8	322·11	152·932	−10·32	−45·64	−24·21	256·02	45·50
10	322·29	154·096	9·83	45·47	24·05	256·46	45·52
12	322·49	155·245	9·34	45·29	23·87	256·90	45·53
14	322·71	156·380	8·85	45·10	23·69	257·35	45·53
16	322·94	157·500	8·36	44·91	23·50	257·80	45·52
18	323·19	158·606	− 7·88	−44·71	−23·29	258·25	45·50
20	323·45	159·697	7·40	44·50	23·08	258·70	45·47
22	323·72	160·773	6·93	44·28	22·85	259·15	45·43
24	324·00	161·835	6·46	44·06	22·62	259·60	45·38
26	324·30	162·881	5·99	43·83	22·37	260·05	45·32
28	324·60	163·912	− 5·53	−43·59	−22·12	260·50	45·24
30	324·91	164·927	5·08	43·35	21·86	260·94	45·15
Sept. 1	325·23	165·925	4·63	43·10	21·59	261·38	45·05
3	325·56	166·907	4·19	42·84	21·31	261·82	44·93
5	325·90	167·871	3·75	42·56	21·02	262·26	44·80
7	326·24	168·817	− 3·32	−42·28	−20·72	262·69	44·65
9	326·58	169·745	2·91	41·99	20·42	263·11	44·49
11	326·92	170·654	2·50	41·69	20·11	263·53	44·31
13	327·27	171·543	2·11	41·38	19·79	263·94	44·11
15	327·62	172·412	1·73	41·06	19·46	264·34	43·89
17	327·97	173·261	− 1·35	−40·72	−19·13	264·73	43·65
19	328·32	174·089	0·98	40·37	18·79	265·12	43·39
21	328·66	174·895	0·63	40·01	18·45	265·49	43·11
23	329·00	175·678	− 0·29	39·63	18·10	265·85	42·81
25	329·34	176·437	+ 0·03	39·24	17·74	266·20	42·48
27	329·67	177·171	+ 0·34	−38·83	−17·38	266·54	42·13
29	330·00	177·880	0·63	38·40	17·01	266·86	41·75
Oct. 1	330·32	178·561	0·91	37·95	16·64	267·17	41·34
3	330·62	179·214	1·18	37·49	16·26	267·46	40·91
5	330·92	179·837	1·43	37·01	15·88	267·73	40·45
7	331·20	180·429	+ 1·65	−36·50	−15·49	267·99	39·95

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Greenwich Noon.		Bright-ness.	Appar. Diam.	Defect of Illumination q	Equat.	Polar.	Central Meridian. ω₀	Passage of Zero Meridian.	
1896.		m	″	″	″	″	°	h m	h m
July	25	0·52	7·88	1·16	·97	·14	278·24	5 36	6 16
	27	0·51	7·95	1·18	·98	·14	258·78	6 56	7 36
	29	0·49	8·03	1·19	0·99	0·15	239·34	8 16	8 56
	31	0·47	8·10	1·20	0·99	·16	219·91	9 36	10 16
Aug.	2	0·46	8·17	1·22	1·00	·16	200·49	10 56	11 36
	4	0·44	8·25	1·23	1·00	·17	181·09	12 15	12 55
	6	0·42	8·33	1·24	1·01	·17	161·70	13 35	14 15
	8	0·40	8·41	1·26	1·02	0·18	142·33	14 55	15 35
	10	0·39	8·49	1·27	1·02	·19	122·97	16 14	16 54
	12	0·37	8·58	1·28	1·03	·19	103·63	17 34	18 13
	14	0·35	8·66	1·30	1·04	·20	84·30	18 53	19 33
	16	0·33	8·75	1·31	1·04	·20	64·99	20 12	20 52
	18	0·31	8·84	1·32	1·05	0·21	45·69	21 32	22 11
	20	0·29	8·94	1·33	1·05	·21	26·41	22 51	23 31
	22	0·27	9·03	1·35	1·06	·22	7·14	...	0 10
	24	0·24	9·13	1·36	1·06	·22	347·89	0 50	1 29
	26	0·22	9·23	1·37	1·07	·23	328·65	2 9	2 48
	28	0·20	9·33	1·38	1·08	0·23	309·43	3 28	4 7
	30	0·18	9·44	1·39	1·08	·23	290·22	4 47	5 26
Sept.	1	0·15	9·55	1·40	1·09	·24	271·03	6 6	6 45
	3	0·13	9·66	1·41	1·09	·24	251·86	7 24	8 4
	5	0·10	9·78	1·42	1·10	·25	232·70	8 43	9 22
	7	0·08	9·90	1·43	1·10	0·25	213·56	10 2	10 41
	9	0·05	10·02	1·44	1·11	·25	194·44	11 20	12 0
	11	0·03	10·15	1·44	1·11	·25	175·34	12 39	13 18
	13	0·00	10·28	1·45	1·11	·26	156·26	13 57	14 36
	15	−0·03	10·41	1·45	1·12	·26	137·20	15 15	15 55
	17	−0·06	10·55	1·46	1·12	0·26	118·15	16 34	17 13
	19	−0·09	10·69	1·46	1·12	·26	99·13	17 52	18 31
	21	−0·12	10·83	1·46	1·12	·26	80·14	19 10	19 49
	23	−0·15	10·98	1·46	1·12	·26	61·16	20 28	21 7
	25	−0·18	11·14	1·46	1·12	·27	42·21	21 45	22 24
	27	−0·21	11·30	1·46	1·12	0·27	23·29	23 3	23 42
	29	−0·24	11·46	1·45	1·12	·27	4·39	...	0 21
Oct.	1	−0·28	11·63	1·45	1·12	·26	345·52	0 59	1 38
	3	−0·31	11·80	1·44	1·11	·26	326·67	2 17	3 56
	5	−0·35	11·97	1·43	1·11	·26	307·85	3 35	4 13
	7	−0·38	12·15	1·42	1·10	0·26	289·07	4 51	5 30

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Greenwich Noon. 1896.		P.	L–O.	B.	A–L.	*B.*	Q.	E.
Oct.	9	331°·47	180°·988	1°·86	35°·96	15°·10	268°·23	39°·42
	11	331·73	181·514	2·05	35·40	14·71	268·44	38·85
	13	331·97	182·005	2·22	34·81	14·31	268·63	38·24
	15	332·19	182·459	2·36	34·20	13·91	268·80	37·60
	17	332·39	182·876	+ 2·48	−33·55	−13·51	268·95	36·92
	19	332·58	183·254	2·59	32·87	13·10	269·07	36·20
	21	332·74	183·591	2·67	32·16	12·69	269·16	35·44
	23	332·88	183·886	2·73	31·41	12·28	269·23	34·63
	25	333·00	184·137	2·76	30·62	11·86	269·26	33·77
	27	333·09	184·343	+ 2·77	−29·80	−11·44	269·26	32·87
	29	333·16	184·502	2·75	28·94	11·02	269·22	31·92
	31	333·20	184·613	2·71	28·03	10·60	269·15	30·91
Nov.	2	333·21	184·673	2·64	27·08	10·18	269·04	29·86
	4	333·20	184·683	2·54	26·09	9·75	268·88	28·75
	6	333·15	184·642	+ 2·41	−25·05	− 9·33	268·67	27·58
	8	333·08	184·549	2·26	23·97	8·90	268·42	26·36
	10	332·98	184·404	2·08	22·84	8·47	268·12	25·09
	12	332·85	184·206	1·87	21·66	8·04	267·76	23·76
	14	332·69	183·957	1·63	20·44	7·61	267·33	22·38
	16	332·50	183·659	+ 1·37	−19 17	− 7·18	266·82	20·95
	18	332·29	183·313	1·08	17·86	6·74	266·23	19·47
	20	332·05	182·919	0·77	16·50	6·31	265·54	17·93
	22	331·79	182·479	0·44	15·11	5·88	264·73	16·35
	24	331·51	181·997	+ 0·08	13·68	5·45	263·76	14·73
	26	331·21	181·476	− 0·29	−12·21	− 5·02	262·59	13·08
	28	330·89	180·919	0·67	10·71	4·58	261·13	11·39
	30	330·57	180·331	1·07	9·19	4·15	259·24	9·68
Dec.	2	330·23	179·716	1·48	7·64	3·72	256·66	7·95
	4	329·88	179·079	1·90	6·08	3·28	252·83	6·23
	6	329·53	178·426	− 2·32	− 4·50	− 2·85	246·34	4·53
	8	329·19	177·764	2·74	2·92	2·42	232·93	2·93
	10	328·85	178·098	3·16	− 1·33	1·99	197·57	1·77
	12	328·51	176·435	3·57	+ 0·24	1·56	136·09	2·20
	14	328·19	175·780	3·97	1·81	1·14	115·63	3·36
	16	327·88	175·138	− 4·36	+ 3·36	− 0·71	105·19	4·96
	18	327·58	174·515	4·73	4·88	− 0·28	99·76	6·60
	20	327·30	173·916	5·18	6·38	+ 0·14	96·41	8·24
	22	327·04	173·346	5·41	7·85	0·56	94·08	9·86

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Greenwich Noon.		Bright-ness.	Appar. Diam.	Defect of Illumination q	Equat.	Polar.	Central Meridian. ω_0	Passage of Zero Meridian.	
1896.		m	″	″	″	″	°	h m	h m
Oct.	9	−0·42	12·34	1·41	1·09	·26	270·32	6 8	6 47
	11	−0·46	12·53	1·39	1·08	·25	251·60	7 25	8 4
	13	−0·50	12·72	1·37	1·06	·25	232·92	8 42	9 20
	15	−0·54	12·92	1·34	1·05	·25	214·27	9 58	10 37
	17	−0·58	13·12	1·32	1·03	0·24	195·66	11 15	11 53
	19	−0·62	13·33	1·29	1·01	·24	177·09	12 31	13 9
	21	−0·66	13·53	1·26	0·98	·23	158·56	13 48	14 26
	23	−0·70	13·74	1·22	0·96	·22	140·07	15 4	15 41
	25	−0·74	13·96	1·18	0·93	·21	121·62	16 19	16 56
	27	−0·79	14·18	1·13	0·90	0·21	103·22	17 34	18 12
	29	−0·83	14·39	1·09	0·86	·20	84·87	18 49	19 27
	31	−0·87	14·61	1·04	0·83	·19	66·56	20 4	20 42
Nov.	2	−0·92	14·83	0·99	0·79	·18	48·31	21 19	21 57
	4	−0·96	15·05	0·93	0·74	·17	30·10	22 34	23 11
	6	−1·01	15·26	0·87	0·70	0·15	11·94	23 48	...
	8	−1·05	15·47	·80	·65	·14	353·84	0 25	1 2
	10	−1·09	15·67	·74	·60	·13	335·78	1 39	2 16
	12	−1·14	15·87	·67	·55	·12	317·78	2 53	3 30
	14	−1·18	16·06	·60	·50	·10	299·83	4 7	4 44
	16	−1·22	16·24	0·54	0·44	0·09	281·92	5 20	5 57
	18	−1·26	16·41	·47	·39	·08	264·07	6 33	7 10
	20	+1·30	16·56	·40	·34	·06	246·26	7 46	8 23
	22	−1·34	16·70	·34	·29	·05	228·49	8 59	9 36
	24	−1·38	16·82	·28	·24	·04	210·76	10 12	10 48
	26	−1·41	16·93	0·22	0·19	0·03	193·07	11 25	12 1
	28	−1·44	17·01	·17	·15	·02	175·42	12 37	13 13
	30	−1·47	17·07	·12	·11	·01	157·80	13 49	14 25
Dec.	2	−1·50	17·11	·08	·08	·01	140·20	15 1	15 37
	4	−1·52	17·12	·05	·05	·00	122·62	16 13	16 49
	6	−1·54	17·11	0·03	0·03	...	105·06	17 25	18 1
	8	−1·56	17·07	·01	·01	...	87·50	18 37	19 13
	10	−1·56	17·01	·00	·00	·00	69·95	19 49	20 25
	12	−1·54	16·92	·01	...	·01	52·39	21 1	21 37
	14	−1·50	16·81	·01	·00	·01	34·82	22 13	22 49
	16	−1·46	16·68	0·03	0·01	0·02	17·24	23 25	...
	18	−1·41	16·53	·05	·03	·02	359·63	0 1	0 37
	20	−1·36	16·36	·08	·05	·03	342·00	1 14	1 50
	22	−1·31	16·16	·12	·08	·04	324·34	2 26	3 2

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Greenwich Noon.	P.	L−O.	B.	A−L.	*B.*	Q.	E.
1896. Dec. 24	326°·79	172°·808	5°·72	9°·28	0°·98	92°·36	11°·44
26	326·57	172·305	− 6·00	+ 10·68	+ 1·40	91·00	12·98
28	326·37	171·840	6·25	12·04	1·82	89·90	14·48
30	326·19	171·416	6·48	13·35	2·24	88·98	15·93
1897. Jan. 1	326·03	171·037	6·68	14·61	2·65	88·20	17·33
3	325·89	170·704	6·86	15·83	3·07	87·54	18·67
5	325·77	170·417	− 7·01	+ 17·00	+ 3·48	86·97	19·95
7	325·68	170·178	7·13	18·12	3·89	86·48	21·18
9	325·61	169·987	7·22	19·19	4·30	86·06	22·35
11	325·55	169·844	7·29	20·21	4·70	85·69	23·46
13	325·52	169·749	7·33	21·18	5·10	85·38	24·52
15	325·50	169·701	− 7·34	+ 22·10	+ 5·50	85·11	25·52
17	325·51	169·699	7·33	22·98	5·90	84·89	26·47
19	325·53	169·741	7·29	23·81	6·30	84·71	27·36
21	325·57	169·826	7·23	24·60	6·69	84·56	28·20
23	325·62	169·953	7·14	25·34	7·08	84·45	29·00
25	325·69	170·120	− 7·03	+ 26·04	+ 7·47	84·37	29·75
27	325·78	170·327	6·91	26·70	7·85	84·32	30·45
29	325·88	170·572	6·76	27·32	8·23	84·30	31·10
31	326·00	170·853	6·60	27·91	8·61	84·30	31·71
Feb. 2	326·14	171·170	6·42	28·46	8·99	84·33	32·28
4	326·29	171·520	− 6·21	+ 28·98	+ 9·36	84·38	32·81
6	326·45	171·902	5·99	29·46	9·73	84·45	33·30
8	326·63	172·315	5·76	29·92	10·10	84·55	33·75
10	326·83	172·758	5·51	30·34	10·47	84·67	34·17
12	327·04	173·229	5·25	30·73	10·83	84·81	34·56
14	327·27	173·726	− 4·97	+ 31·10	+ 11·19	84·96	34·92
16	327·51	174·248	4·68	31·45	11·54	85·13	35·24
18	327·76	174·794	4·38	31·87	11·89	85·32	35·53
20	328·03	175·363	4·06	32·07	12·24	85·52	35·80
22	328·31	175·953	3·73	32·35	12·58	85·74	36·04
24	328·60	176·564	− 3·39	+ 32·60	+ 12·92	85·97	36·26
26	328·91	177·195	3·05	32·84	13·26	86·22	36·45
28	329·23	177·844	2·69	33·06	13·60	86·48	36·62
Mar. 2	329·57	178·511	2·32	33·26	13·93	86·75	36·77
4	329·92	179·196	1·95	33·45	14·25	87·03	36·89
6	330·28	179·899	− 1·57	+ 33·62	+ 14·57	87·32	36·99

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Greenwich Noon.	Bright-ness.	Appar. Diam.	Defect of Illumination q	Equat.	Polar.	Central Meridian. ω_0	Passage of Zero Meridian.	
1896.	m	″	″	″	″	°	h m	h m
Dec. 24	−1·26	15·69	·16	·11	·05	306·65	3 39	4 15
26	−1·20	15·74	0·20	0·14	0·06	288·92	4 51	5 28
28	−1·14	15·50	·25	·17	·07	271·15	6 4	6 41
30	−1·08	15·26	·29	·21	·08	253·34	7 17	7 54
1897.								
Jan. 1	−1·00	15·01	·34	·24	·09	235·48	8 31	9 7
3	−0·96	14·75	·39	·28	·10	217·57	9 44	10 21
5	−0·90	14·48	0·44	0·31	0·11	199·62	10 58	11 35
7	−0·84	14·22	·48	·35	·12	181·62	12 12	12 49
9	−0·78	13·95	·52	·39	·13	163·57	13 26	14 3
11	−0·71	13·68	·57	·42	·14	145·47	14 40	15 17
13	−0·65	13·41	·61	·45	·14	127·32	15 54	16 32
15	−0·59	13·14	0·64	0·48	0·15	109·12	17 9	17 47
17	−0·53	12·88	·68	·51	·16	90·88	18 25	19 2
19	−0·47	12·62	·71	·53	·16	72·59	19 40	20 17
21	−0·41	12·36	·73	·55	·16	54·26	20 55	21 33
23	−0·35	12·11	·76	·57	·17	35·88	22 10	22 48
25	−0·29	11·86	0·78	0·59	0·17	17·46	23 26	...
27	−0·23	11·62	·80	·61	·17	359·00	0 4	0 42
29	−0·18	11·38	·82	·62	·17	340·51	1 20	1 58
31	−0·12	11·15	·83	·63	·18	321·98	2 36	3 14
Feb. 2	−0·06	10·92	·84	·64	·18	303·41	3 52	4 30
4	−0·01	10·70	0·85	0·65	0·18	284·80	5 9	5 47
6	0·04	10·49	·86	·66	·18	266·17	6 25	7 3
8	0·10	10·28	·87	·66	·18	247·50	7 42	8 20
10	0·15	10·08	·87	·67	·18	228·80	8 59	9 37
12	0·20	9·89	·87	·67	·18	210·08	10 16	10 54
14	0·25	9·70	0·87	0·67	0·18	191·33	11 33	12 11
16	0·30	9·51	·87	·67	·17	172·55	12 50	13 29
18	0·35	9·33	·87	·67	·17	153·75	14 7	14 46
20	0·39	9·16	·87	·66	·17	134·93	15 24	16 3
22	0·44	8·99	·86	·66	·17	116·09	16 42	17 21
24	0·48	8·83	0·85	0·66	0·17	97·22	17 59	18 38
26	0·53	8·67	·85	·65	·16	78·33	19 17	19 56
28	0·57	8·52	·84	·65	·16	59·42	20 35	21 14
Mar. 2	0·61	8·38	·83	·64	·16	40·50	21 52	22 31
4	0·65	8·23	·82	·64	·16	21·56	23 10	23 49
6	0·69	8·09	0·81	0·63	0·15	2·60	...	0 28

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Greenwich Noon.		P.	L–O.	B.	A–L.	*B.*	Q.	E.
1897. Mar.	8	330°66	180°617	1°18	33°78	14°89	87°63	37°07
	10	331·05	181·350	0·78	33·92	15·21	87·95	37·14
	12	331·45	182·098	– 0·37	34·05	15·52	88·28	37·19
	14	331·86	182·860	+ 0·04	34·16	15·83	88·61	37·22
	16	332·29	183·635	+ 0·45	+ 34·26	+ 16·13	88·95	37·24
	18	332·73	184·422	0·87	34·36	16·43	89·30	37·24
	20	333·18	185·221	1·30	34·44	16·72	89·66	37·23
	22	333·64	186·032	1·73	34·51	17·01	90·03	37·21
	24	334·12	186·855	2·17	34·57	17·30	90·40	37·17
	26	334·61	187·689	+ 2·61	+ 34·62	+ 17·58	90·78	37·12
	28	335·10	188·533	3·05	34·66	17·86	91·16	37·05
	30	335·61	189·388	3·50	34·69	18·14	91·55	36·97
Apr.	1	336·13	190·254	3·95	34·72	18·41	91·94	36·89
	3	336·66	191·130	4·40	34·74	18·67	92·34	36·79
	5	337·20	192·016	+ 4·85	+ 34·74	+ 18·93	92·74	36·68
	7	337·76	192·912	5·31	34·74	19·19	93·14	36·56
	9	338·32	193·817	5·77	34·73	19·44	93·55	36·44
	11	338·89	194·731	6·23	34·72	19·69	93·96	36·30
	13	339·47	195·655	6·69	34·70	19·93	94·37	36·16
	15	340·06	196·587	+ 7·15	+ 34·67	+ 20·17	94·78	36·00
	17	340·66	197·528	7·61	34·63	20·40	95·20	35·84
	19	341·27	198·477	8·07	34·59	20·62	95·62	35·67
	21	341·88	199·435	8·54	34·54	20·84	96·03	35·50
	23	342·50	200·402	9·00	34·48	21·06	96·45	35·31
	25	343·13	201·377	+ 9·46	+ 34·42	+ 21·27	96·87	35·12
	27	343·77	202·361	9·92	34·35	21·48	97·29	34·92
	29	344·42	203·353	10·38	34·27	21·68	97·70	34·72
May	1	345·07	204·354	10·84	34·19	21·88	98·11	34·51
	3	345·73	205·363	11·29	34·10	22·07	98·52	34·30
	5	346·40	206·381	+ 11·75	+ 34·00	+ 22·26	98·93	34·08
	7	347·08	207·408	12·20	33·90	22·44	99·34	33·86
	9	347·76	208·443	12·65	33·79	22·62	99·75	33·63
	11	348·45	209·486	13·09	33·68	22·79	100·15	33·39
	13	349·14	210·538	13·53	33·56	22·95	100·55	33·15
	15	349·84	211·598	+ 13·97	+ 33·43	+ 23·11	100·94	32·90

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Greenwich Noon.		Bright-ness.	Appar. Diam.	Defect of Illumination q	Equat.	Polar.	Central Meridian. ω_0	Passage of Zero Meridian.	
1897.		m	″	″	″	″	°	h m	h m
Mar.	8	0·73	7·96	·80	·62	·15	343·63	1 7	1 46
	10	0·77	7·83	·79	·62	·15	324·64	2 25	3 4
	12	0·81	7·70	·78	·61	·15	305·63	3 43	4 22
	14	0·85	7·58	·77	·60	·14	286·61	5 2	5 41
	16	0·88	7·47	0·76	0·59	0·14	267·58	6 20	6 59
	18	0·92	7·35	·75	·59	·14	248·54	7 38	8 17
	20	0·95	7·24	·74	·58	·13	229·48	8 56	9 35
	22	0·99	7·13	·73	·57	·13	210·42	10 15	10 54
	24	1·02	7·03	·71	·56	·13	191·34	11 33	12 12
	26	1·05	6·93	0·70	0·55	0·13	172·25	12 51	13 31
	28	1·08	6·83	·69	·54	·12	153·15	14 10	14 49
	30	1·11	6·74	·68	·54	·12	134·04	15 28	16 8
Apr.	1	1·14	6·65	·67	·53	·12	114·91	16 47	17 26
	3	1·17	6·56	·65	·52	·11	95·78	18 6	18 45
	5	1·20	6·47	0·64	0·51	0·11	76·64	19 24	20 4
	7	1·23	6·39	·63	·50	·11	57·49	20 43	21 23
	9	1·25	6·31	·62	·49	·10	38·33	22 2	22 41
	11	1·28	6·23	·60	·49	·10	19·16	23 21	...
	13	1·31	6·15	·59	·48	·10	359·98	0 0	0 39
	15	1·33	6·08	0·58	0·47	0·09	340·79	1 19	1 58
	17	1·36	6·00	·57	·46	·09	321·60	2 38	3 17
	19	1·38	5·93	·56	·45	·09	302·40	3 57	4 36
	21	1·40	5·87	·55	·45	·08	283·19	5 16	5 55
	23	1·43	5·80	·53	·44	·08	263·97	6 35	7 14
	25	1·45	5·74	0·52	0·43	0·08	244·74	7 54	8 33
	27	1·47	5·67	·51	·42	·07	225·50	9 13	9 52
	29	1·49	5·61	·50	·41	·07	206·25	10 32	11 11
May	1	1·51	5·56	·49	·41	·07	187·00	11 51	12 31
	3	1·53	5·50	·48	·40	·07	167·74	13 10	13 50
	5	1·55	5·44	0·47	0·39	0·06	148·47	14 29	15 9
	7	1·57	5·39	·46	·39	·06	129·19	15 48	16 28
	9	1·59	5·34	·45	·38	·06	110·90	17 8	17 48
	11	1·60	5·29	·44	·37	·06	90·61	18 27	19 7
	13	1·62	5·24	·43	·36	·05	71·31	19 47	20 26
	15	1·64	5·19	0·42	0·36	0·05	52·01	21 6	

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In the preparation of the present ephemeris I have, not without hesitation, adopted the position of the axis of *Mars* which Hermann Struve has deduced from his investigation of the orbits of the satellites, published in No. 3302 of the *Astron. Nachrichten.* The inclination of the equator to the orbit of *Mars* is increased $0^\circ\cdot344$, but the node on the orbit set back $2^\circ\cdot973$, and it is a question whether the foundation for the new determination is already sufficiently secure to warrant its superseding the previous determination from spots. Nevertheless, I have considered it better to make the change, especially as the computed areographical positions of the Earth and Sun will serve for the satellites as well as for the planet.

P denotes the position-angle of the axis of *Mars*, $\mathrm{L}-\mathrm{O}+180^\circ$ the longitude of the Earth referred to the plane of *Mars'* equator, and reckoned from O, the point of the vernal equinox of the planet's northern hemisphere, B the latitude of the Earth, $\Lambda-\mathrm{L}$ the difference of the longitudes of Sun and Earth, B the latitude of the Sun, Q the position angle of the greatest defect of illumination or $\mathrm{Q}+180^\circ$ that of the Sun, E the areocentric angle between Earth and Sun.

The brightness of *Mars*, expressed in star magnitudes, is computed by Professor G. Müller's formula—

$$-1^{\mathrm{m}}\cdot787+5\log\frac{r\Delta}{r_0(r_0-1)}+0\cdot01486\alpha\ (\text{here E}),$$

or rather by its equivalent—

$$+5\log(r\Delta)+0\cdot01486\,\mathrm{E}+0\cdot703-2,$$

in which the defect of illumination is assumed to be represented by the empirical term containing the angle E expressed in degrees.

The measures of the planet's diameter made with powerful instruments and wire micrometers, demand the assumption of a larger value than that derived from measures made with heliometers of rather low power, but the most suitable assumption can only be made when the resulting measures of the equatorial and polar diameters for each observed set are published, so that the corrections for phase may be properly applied.

If a web or a line is moved in the direction of the position-angle p or $p+180^\circ$, the distance of the tangent to the curve forming the limit of illumination from the centre will be

$$a\sqrt{1-\sin^2\mathrm{E}\cos^2(p-\mathrm{Q})},$$

or the difference between the diameter $2a$ and the distance of the two tangents touching the visible disc will be

$$2a\,(1-\sqrt{1-\sin^2\mathrm{E}\cos^2(p-\mathrm{Q})}),$$

so that the defect of illumination is

$$2a\sin^2\tfrac{1}{2}\delta,\ \text{if}\ \sin\delta=\sin\mathrm{E}\cos p-\mathrm{Q}.$$

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For the equatorial and polar diameters the values of sin δ are accordingly sin E sin (P − Q) and sin E cos (P − Q) and for the diameters in position-angle 90° and 0° sin E sin Q and sin E cos Q, the visible defect being within 90° of Q.

The apparent diameters and the defects of illumination q in position-angle Q and of the equatorial and polar diameters are computed with the assumed value (at distance 1) $9''\cdot 60$.

The difference of about 5°, which Mr. Percival Lowell has found between the areographical longitudes of some spots derived from his observations of 1894 and the corresponding longitudes of *Schiaparelli*, which the ephemeris was intended to represent approximately, requires to be traced to its source and to be cleared up. A search for some error in my computations, which might account for the difference, has hitherto been unsuccessful, and an alteration of the adopted rate of rotation, such as would reconcile the deduced longitudes of 1894 with those of 1879, could not be reconciled with the older observations. Under these circumstances I have had to defer the further search for the source of the error and to break the continuity of the "Longitudes of the Central Meridian" by adopting in the present ephemeris approximate alterations derived from Mr. Lowell's statements. When the detailed observations of 1896–97 as well as of 1894 shall have become known, I intend to resume the search.

The data of the ephemeris are already corrected for the equation of light, so that they are to be interpolated directly for the times for which they are required. The differences between successive values of ω_0, the longitude of the central meridian, vary between $700°\cdot 16$ and $702°\cdot 45$.

The ephemeris for the opposition of 1886 in vol. xlvi. of the *Monthly Notices* is accompanied on p. 33 by some remarks, which observers will perhaps bear in mind during the approaching observing season. "It is desirable that the question should be settled how far the variations in the aspect of the dark markings on *Mars* are due to the relative position of the Sun and the Earth, and especially what changes take place in the aspect of a marking, when, in the course of rotation, it reaches or leaves the vicinity of the point where Sun and Earth have the same zenith distances, but opposite azimuths." This point is in position-angle Q + 180 and at the areocentric angular distance $\frac{1}{2}$E from the apparent centre of the disc, but as "observers may perhaps be more readily induced to watch their opportunities, if they can easily get the areographical longitude ω' and latitude β' of the point," I gave there a special little list. As the present ephemeris contains the values of Λ − L and of *B* referring to the Sun, the areographical position of the point where the effect of reflected sunlight may be looked for is approximately—

$$\omega' - \omega_0 = -\tfrac{1}{2}(\Lambda - \mathrm{L})$$
$$\beta' = \tfrac{1}{2}(\mathrm{B} + B).$$

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The seasons on *Mars* begin according to the assumed position of the planet's equator

1896 July 13·7 Winter solstice of *Mars*' northern hemisphere
Dec. 19·3 Spring equinox " " "

On April 8, at 1^{h} 32^{m} Gr. *Mars* passes 2'·1 south of the star $3^{m}\cdot2$ ϵ *Geminorum.*

Col. Cooper's Observatory:
Markree, Collooney, Ireland.